

Effective public health policy requires an understanding of history.

We hope that the articles published in this column will represent an engaged form of scholarship that will prove highly relevant to contemporary concerns. At the same time, we will require that they meet the scholarly standards of the historical profession in the critical use of sources and informed interpretation.

This past fall we sent a questionnaire to more than 300 APHA members who

had indicated an interest in the history of public health. We received a tremendous response. People suggested articles they might write, topics on which they could serve as reviewers, and ideas for papers to be presented at the APHA meetings. Most encouraging was the interest in forming a special interest group or section in the APHA devoted to the history of public health. As a result, an organizational meeting will take place in Atlanta. We hope that this column can cap-

ture and contribute to the enthusiasm that exists for an understanding of the past that can shape the future. If you have an article, an idea for an article, or suggestions about important work by another scholar, we would appreciate hearing from you. □

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ABSTRACT

This study examines the early efforts of the United Mine Workers of America to illuminate the problem of occupational respiratory diseases in the coal fields. The union used the hearings of the US Anthracite Coal Strike Commission of 1902–3 to draw public attention to “miners’ asthma.” In 1915, it began to agitate for the provision of workers’ compensation benefits for victims of this disorder. Throughout the 1950s and 1960s, the union’s Welfare and Retirement Fund disseminated information on advances in understanding chronic pulmonary diseases of mining. In particular, the miners’ fund promoted the British conceptualization of a distinctive coal workers’ pneumoconiosis. At the same time, the staff of the union health plan pressed the US Public Health Service and the Pennsylvania Department of Health to investigate the prevalence of occupational respiratory diseases among bituminous miners. Taken together, these endeavors contributed significantly to growing recognition of the severity and extent of this important public health problem and thus helped lay the foundation for the Federal Coal Mine Health and Safety Act of 1969. (*Am J Public Health*. 1991;81:781–789)

The United Mine Workers of America and the Recognition of Occupational Respiratory Diseases, 1902–1968

Alan Derickson, PhD

Introduction

To achieve widespread acceptance of the occupational origin of a chronic disease is a difficult matter. In the case of coal workers’ pneumoconiosis (CWP), as with other related chronic respiratory conditions affecting bituminous and anthracite miners in the United States, the process has been an especially tortuous one.¹ Strenuous denial of the existence or extent of CWP long curtailed awareness among public health officials, biomedical scientists, and medical practitioners in coal-mining centers. In a sense, the validation of the existence of a distinctive, disabling respiratory ailment caused by the inhalation of coal mine dust came only in 1969 with the enactment of the Federal Coal Mine Health and Safety Act.

The issue of coal workers’ lung diseases gained unprecedented national attention in the wild winter of 1968–69 when Ralph Nader, three crusading physicians, and a handful of activists ignited a grassroots movement for changes in working conditions and workers’ compensation. A number of dramatic events, particularly the spontaneous strike of more than 40,000 miners in West Virginia for workers’ compensation reform in February and March 1969, attracted new interest in the problem of occupational respiratory disease in this industry. Not surprisingly, subsequent historical analysis has focused on these spectacular developments.²

However, the preoccupation with the immediate antecedents of the Federal Coal Mine Health and Safety Act should not lead to the conclusion that before the late sixties there was little debate over what became known as black lung. This essay argues that miners’ lung diseases were the object of recurrent, often heated, contention from the turn of the century on and that, in turn, this controversy gradually produced knowledge of the problem. In part, these disorders became controversial because of the efforts of the United Mine Workers of America (UMWA). Indeed, in many ways the union helped set the stage for the reform movement that arose at the end of the 1960s.

The Anthracite Coal Strike Commission

The miners’ organization forcefully raised the question of occupational respiratory disease just after the turn of the century. The advent of the Progressive Era brought a significant change in public policy toward workers’ rights to organize and to engage in collective action for mutual protection. Whereas Eugene Debs went to jail for his role in the Pullman

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strike in 1894, the UMWA's John Mitchell went to the White House in the midst of the anthracite strike of 1902 to confer with Theodore Roosevelt. Beyond welcoming a union president, Roosevelt further legitimated labor organization by his proposal that a federal commission, not the US Army, resolve this dispute. Both the magnitude of the conflict and the importance of hard coal forced innovative presidential action. In terms of worker days lost, this was by far the largest work stoppage in US history up to that time. Moreover, by October 1902, the strike of approximately 150,000 workers had raged on for five months and threatened to create a critical shortage of fuel for the coming winter.

The UMWA welcomed the opportunity to present its case in an unprecedented public forum. Mitchell sought not only to gain a favorable settlement but to demonstrate to the American people and their political leaders that unions were respectable institutions with just aims. These aims not only included the immediate objectives of higher wages and shorter hours, they also encompassed a broader demand for a historic reckoning of the full human cost of the development of the hard-coal industry.³ The proceedings of the Anthracite Coal Strike Commission gave the UMWA a unique chance to enlist public sympathy for the plight of the victims of decades of exploitation.

The hearings began in November 1902 in Scranton, Pennsylvania. The union case, coordinated by attorney Clarence Darrow, dwelt at length on the adverse health effects of underground work. This was not, to be sure, a strike to eradicate the dust hazard in the hard-coal mines but instead a campaign for higher wages, shorter hours, and other conventional union demands. To these ends, the UMWA argued that the heavy toll taken by chronic respiratory conditions helped justify its proposals. In his opening statement, John Mitchell contended that health risks warranted a wage increase: "If he [the miner] escapes death or injury by falls of rock or coal, he cannot escape attacks of miners' asthma, a disease peculiar to those who mine anthracite coal." In the same vein, Mitchell maintained that part of the rationale for the eight-hour workday was the "unhealthful" nature of anthracite extraction.⁴

The union brought in a number of physicians and disabled miners to corroborate its claims. Dr. John O'Malley of Scranton considered miners' asthma a dose-related disorder brought about by "[t]he inhalation of great quantities of coal

dust and powder smoke and vitiated air." O'Malley held that the lungs became "saturated with this coal dust, . . . [which] acts as an irritant." He noted that on post mortem examination, the veteran miner's lung "looks like a chunk of anthracite coal."⁵ Tracing the disease back to its source, the union's medical consultants maintained that many workers' problems began with the heavy doses of dust incurred when they went to work as children picking slate and other impurities out of freshly dug coal in breakers, i.e., coal-processing mills. When exposure commenced at the age of eight or ten years, symptoms of disease often set in by middle age. Dr. Frank P. Lenahan claimed to have seen cases where the disease set in at the early age of 30 years.⁶

By the beginning of the twentieth century, some observers recognized pneumoconiosis in coal workers as a clinical entity. The most obvious symptom was shortness of breath on exertion. Indeed, the disorder was called miners' asthma largely because of the extreme, often paroxysmal, dyspnea that its victims exhibited. Dr. Lenahan told the commission that some individuals could not lie down to sleep and had to "sit up at night gasping for breath." Dr. Richard Gibbons described the typical advanced patient as "the marked picture of distress that is commonly seen, an individual walking along and being overtaken by air starvation, so to speak."⁷ Men with miners' asthma who testified averred their difficulty in breathing.⁸ The union's witnesses also noted two other common symptoms—the production of sputum containing coal particles and persistent cough.⁹

Coal workers' pneumoconiosis in its complicated form had a pathognomonic sign that was identifiable even at the turn of the century. As James Merchant and his colleagues recently put it, "Melanoptysis, the often dramatic production of several ounces of black inky sputum from a ruptured lesion, can be considered the only specific, though somewhat unusual, clinical sign of CWP."¹⁰ At the session of hearings on November 21, 1902, Dr. Eugene Butler was asked to describe the sputum of one of his patients. Butler replied, "You could use it for ink." In fact, during the nineteenth century comparison to ink was commonplace, and in at least one instance not figurative. A Colorado physician used this fluid to draft a portion of the manuscript for a case report on a miner's illness published in 1882.¹¹

The pronoun physicians traced for the commissioners the gradual deterioration of their patients. Dr. O'Malley held

that the typical victim was "really as old at the age of 40 as another man in another vocation at the age of 70. He has a decrepid [sic], dull, haggard, emaciated appearance, and he looks prematurely old; in fact, [he] is prematurely old." O'Malley also noted that some individuals with miners' asthma eventually developed emphysema as well. He and his colleagues concurred that the disease gradually became quite debilitating. Dr. Lenahan reported that pneumoconiotics lost earnings because of their respiratory impairment and that many were not even able to walk. Patrick Welsh, a disabled hard-coal worker, testified that miners' asthma significantly limited his ability to labor underground.¹²

Some disabled men left the work force. A sizable share ended up in the poorhouse. Lenahan estimated that 70% of the inmates of one nearby almshouse were exminers and that 60% of them had "lung trouble."¹³ To avoid this most humiliating fate, some disabled anthracite workers turned to the breakers for less arduous, but not less dusty, labor. John Devenny told the commission that the previous year miners' asthma had driven him at age 51 to take a job cleaning coal along with children for \$0.90 per ten-hour day. Dr. Butler pointed out that "these old men that pick slate in the breakers, they do not last long."¹⁴ The UMWA case to the federal arbitrators did not, however, include any statistical evidence on the average longevity for occupational disease victims. Because the union had based its wage and hour demands in part on claims of diminished life expectancy and, more specifically, of shortened careers, this deficiency significantly weakened its case.

Similarly, the prolabor doctors made only the most informal estimates of the prevalence of miners' asthma. O'Malley considered the disease to be "very common in this territory." Butler called it "quite a common occurrence among the miners, after a number of years in the mines." He offered to substantiate his contention by bringing 100 patients to the next day's hearings. Veteran miner John Stannix boldly estimated that half the anthracite work force had miners' asthma. John Mitchell went even further, asserting that "[t]here is scarcely a mine-worker who has not contracted this malady to some degree."¹⁵

Obviously, the revelations of these witnesses helped physicians, operators, the miners themselves, and the general public in the anthracite region to recognize more fully the problem of industrial dis-



Coal miners at work in Rossiter, Pennsylvania (no date). Courtesy of Historical Collections and Labor Archives, Pennsylvania State University.

ease. Newspapers took the story to a much wider audience. The *New York Times* recounted O'Malley's observation of lungs as black as coal and quoted Mitchell's claim that older miners could not escape miners' asthma. The *Chicago Tribune* also seized on O'Malley's vivid description of autopsies in an article subtitled "Few Escape the Asthma."¹⁶ The *Pittsburgh Press* ran a front-page story, "Disease and Death Lurk in Coal Mine," which reported that "the avocation of miner usually brings on miners' asthma" and that "complications resulting from miners' asthma were usually fatal."¹⁷

Not surprisingly, the anthracite operators vigorously counterattacked. In his opening statement, S. P. Wolverton of the Philadelphia and Reading Coal and Iron Company promised to show that "mining is not an unhealthy occupation." James H. Torrey of the Delaware and Hudson Railroad asserted that the commission would have no choice but to find that digging hard coal was "more than ordinarily healthful."¹⁸ The operators used a variety of arguments to dismiss their employees' respiratory maladies. They cited mortality data from Britain that appeared to show that extracting coal was a relatively benign occupation. Clarence Darrow and commissioner John Spalding observed, however, that occupational mortality data were distorted because a substantial num-

ber of the disabled departed from mining before they died, and, as a consequence, their deaths were charged against some other occupation or against no occupation at all.¹⁹

Management's physicians argued that they seldom encountered miners' asthma. Dr. W. G. Fulton, for one, believed that it was "[n]ot very prevalent."²⁰ To reinforce this point, the operators led in a parade of foremen and superintendents to swear that they had under their charge only a minimal number of asthma victims and a large complement of robust old employees.²¹ Management portrayed the disease as largely a vestige of the days before improved underground ventilation.²²

Pressed for an immediate decision and buried by an avalanche of contradictory and often unverifiable testimony (amounting to more than 10,000 pages) and accompanying exhibits on a long list of complex issues, the Anthracite Coal Strike Commission faced an impossible task. Hence, it is not surprising that in crafting a strike settlement the commissioners devoted very little attention to the difficult question of industrial disease. In its report to President Roosevelt the commission granted, without delving into the respiratory disease controversy per se, that some increase in wages should be made in part because of "the hazardous

nature of the employment."²³ Obviously, nothing was settled with regard to the nature and magnitude of the phenomenon of work-related diseases in the hard-coal industry. Nonetheless, the UMWA had used this very prominent forum to begin to publicize the issue among its members.

In the aftermath of the anthracite strike settlement, the operators took the offensive. They promoted the notion that the inhalation of coal dust conferred immunity to germs in general and the tubercle bacillus in particular. They dismissed the dismal appearance of miners' lung tissue on autopsy as merely a benign discoloration that differed little from that found in all members of urban society. They embarked on a search for old miners. *Coal Age*, the industry's leading trade journal, began to celebrate the birthdays of especially elderly workers. In 1915, this journal printed a piece entitled "The Long Life of Coal Miners," which emphatically declared that "the atmosphere of the mine is now vindicated even though its healthfulness has not yet been extolled."²⁴ In 1911, the *United Mine Workers Journal* denounced such assertions about the innocence of working conditions in bituminous mines and published an angry letter by a rank-and-file member from Missouri. In his letter to the editor, Joseph Pico suggested that anyone who takes a mining job to cure his respiratory ailments "will soon be where he doesn't need any cure." Pico expressed facetious regret to those who proclaimed the salubrity of underground labor: "Too bad you can't persuade [J.] Pierpont Morgan, J. D. Rockefeller and all the would-be's to try your remedy." Pico went on to name co-workers who had died of miners' asthma and argued that many old men with injured lungs kept working simply because their options were to "dig coal or [go to] the poorhouse."²⁵

Workers' Compensation Initiatives

The *United Mine Workers Journal* also called attention to the widespread prevalence of this disease and the consequent need for corrective action. In September 1913, the newspaper reported that John Andrews of the American Association for Labor Legislation (AALL) had recently encouraged the American Public Health Association to support compensation for miners' asthma and other occupational diseases. To middle-class Progressive reformers like Andrews, the

preventive function of social insurance was straightforward: Payment of workers' compensation benefits to sick employees led to higher compensation insurance premium rates for employers; high insurance costs, in turn, drove management to control health hazards in the workplace.²⁶ Pragmatic unionists, however, approached this subject with some trepidation. At the AALL annual meeting in 1914, both Mitchell and Van Bittner, the president of the UMWA district surrounding Pittsburgh, expressed fears that the enactment of compensation legislation would lead to mass firings of the disabled to forestall payment of insurance benefits. Bittner enlightened the assemblage of reformers on the extent of this malady in the anthracite and bituminous fields of Pennsylvania: "I say that 65 percent or 67 percent of the men who work in the mines of this state over ten years have miners' asthma."²⁷

Despite its misgivings about the possibility that social insurance would precipitate the preemptive termination of individuals with any suspicious symptoms, the union soon became the leading advocate of workers' compensation for miners' asthma. Although it is beyond the scope of this essay to describe fully the efforts of the UMWA to gain workers' compensation both to aid disease victims and to bring financial pressure on the mine owners to ameliorate working conditions, it is necessary to point out that such demands helped to raise the consciousness of miners, political leaders, public health officials, and mine operators about this issue. Union agitation for an amendment of state compensation statutes began in 1915 when Thomas Kennedy, then president of District 7 in eastern Pennsylvania, called for coverage of work-induced respiratory disease.²⁸ In Illinois, long-time UMWA leader John Walker led another early campaign for workers' compensation in the 1920s.²⁹

The three UMWA district organizations in the anthracite region continued to demand workers' compensation reform throughout the 1920s and into the early 1930s.³⁰ This pressure left the Pennsylvania Commission on Compensation for Occupational Disease, appointed in 1932, little choice but to explore the extent and severity of coal workers' respiratory disorders. Thomas Kennedy served as the UMWA representative on this commission and, predictably, encountered considerable opposition to any recommendation for compensation for miners' asthma. The group hastily conducted a survey and

found that its sample of 78 physicians in the hard-coal region had 10,214 patients with "well-developed" cases. This finding and other evidence led the commissioners to recommend extension of compensation benefits to persons with "chronic incapacitating miners' asthma." The commission's report, published in March 1933, undoubtedly contributed to broader recognition of the disorder. Within four months of publication, the state had already distributed 1,000 copies of the document and printed 5,000 more.³¹ The report also led directly to a major field investigation by the US Public Health Service during 1933 and 1934, in which the UMWA actively cooperated. This study discovered that 22 percent (616) of 2,711 working anthracite workers examined suffered from what the researchers reconceptualized as anthraco-silicosis.³² The development of this very narrowly defined disorder reflected the influence of major disclosures as to the prevalence and severity of silicosis, which had established that disease as the paradigmatic pneumoconiosis.³³ In 1937 Pennsylvania made anthraco-silicosis compensable. Other states enacted disease compensation provisions that were even more tightly drawn in their requirements that claimants display x-ray evidence of classic silicosis. (Few breathless miners could meet this criterion.)³⁴

The Welfare and Retirement Fund

Workers' compensation of this variety proved to be no panacea. By 1946 the *United Mine Workers Journal* merely expressed the consensus when it characterized occupational disease compensation as "a [j]oke."³⁵ Tellingly, the point of the article in which this curt dismissal appeared was that respiratory diseases, together with a host of other work-related afflictions, necessitated the creation of a health and welfare fund in the anthracite industry. Simultaneously, John L. Lewis and other union leaders pressed for a similar program for bituminous workers. In both the hard- and soft-coal industries, factors beyond occupational disease drove the UMWA to seek new health-care and income-maintenance provisions. By the mid-forties, rank-and-file miners were exasperated with the paternalistic system in which regular mandatory deductions from their wages supported physicians selected and controlled by their employers. Moreover, recent wartime wage restrictions had steered union negotiators

toward "fringe" benefits. Determined to change the methods of providing for sick, injured, disabled, and elderly members, the UMWA struck the bituminous mines on April 1, 1946, and the anthracite mines two months later.³⁶

The miners' organization settled the bituminous dispute with the concession that henceforth employee wage deductions would be remitted to a union-controlled hospital and medical fund, not to a company doctor. The bituminous agreement also called for a separate welfare plan to maintain income for the elderly and disabled. In anthracite, the UMWA went further, establishing a unified benefit program. More important, the Anthracite Health and Welfare Fund was financed not by wage deductions but rather by an assessment of five cents on each ton of coal mined. The following year, the union forced bituminous operators to accept a similar arrangement for a Welfare and Retirement Fund (WRF). A health benefit plan supported solely by a royalty on production offered a new way to shift to employers the economic burden imposed by occupational diseases. By imposing a financial obligation that was uniform across the industry, the WRF avoided the thorny problem of variations among states in workers' compensation provisions.³⁷

The fund transformed health care for bituminous miners. It established ten hospitals through the Miners Memorial Hospital Association, stimulated the growth of group practice arrangements, and raised the quality of health services in countless mining communities. In particular, in many localities the fund supplanted the employer-controlled medical system that had long stood as a bulwark against recognition of the occupational factors in miners' pulmonary disorders. For decades, company doctors had failed to diagnose chronic pulmonary diseases as work-induced.³⁸ In contrast, the WRF spent millions of dollars to identify and treat such disorders during the period from the late forties through the late sixties.³⁹

The fund that served bituminous miners saw its mission as more than just the provision of good health care. Through the exertions of a number of members of its medical staff, the organization set out in the early 1950s to create knowledge of miners' respiratory diseases and to disseminate that knowledge widely so that it might be put to the most constructive use. Unmistakably, this wide-ranging educational effort represented a bold new strategy for a labor organization. Fostering

medical and lay awareness of British scientific discoveries was an important part of this program. Beginning in the 1930s, advances in pathology, radiology, and epidemiology had led to the reconceptualization of the distinctive miners' dust-induced respiratory disorder as coal workers' pneumoconiosis. British research made clear that this disease arose in the absence of exposure to silica, exhibited a characteristic lesion (the coal macule), and differed from silicosis in its radiographic appearance and in other ways as well. In Britain, the clarification of the nature of CWP had led directly and immediately to the granting of thousands of workers' compensation claims, from 1943 on.⁴⁰

In 1951 Warren Draper, executive medical officer of the WRF, assigned Lorin E. Kerr the task of gathering and disseminating information on this subject. A physician trained in public health, Kerr had come to the miners' fund in 1948 from the US Public Health Service. While serving as an area medical officer for the WRF in West Virginia in the late forties, he had encountered a large number of miners with chronic respiratory ailments.⁴¹ Kerr did many things to promote professional awareness of coal workers' pneumoconiosis as a discrete disease. He began by making a comprehensive review of the British literature on CWP, emphasizing the many differences from silicosis. Despite the opposition of some authorities who had heavily invested in the anthracosilicosis conception, *Industrial Medicine and Surgery* published Kerr's article "Coal Workers' Pneumoconiosis" in 1956.⁴² Moreover, physicians with fund-supported clinics and members of the staff of the Miners' Memorial Hospitals conducted original research on CWP and chronic bronchitis during the fifties and sixties.⁴³ The bituminous health plan did not make extramural research grants; it did, however, give investigators access to groups of disabled miners and former miners.⁴⁴

Kerr helped bring to the US many of the leading British authorities on pneumoconiosis. He also prevailed upon others who came to this country under other auspices to participate in various educational programs. On numerous occasions, British researchers explained their state-of-the-art methods and findings to North American scientists and clinicians. In the course of these proceedings, they had ample opportunity to take on skeptics. The first round of meetings came in the fall of 1952, when Kerr arranged for Charles

Fletcher and Philip Hugh-Jones to discuss CWP with chest physicians in Washington, DC. Perhaps more important, WRF staff introduced British medical workers into mining districts far from the academic medical centers of the East Coast. Robert Ian McCallum, who had played an important part in standardizing the classification of pneumoconiosis x-rays, toured Ohio, West Virginia, Tennessee, and Alabama in mid-1954 after working at the fund's office in Pittsburgh during the preceding year.⁴⁵ John Gilson, director of the Pneumoconiosis Research Unit in Cardiff, Wales, conferred with physicians in several locations in 1955. When Jethro Gough came in 1958, his lecture in Pittsburgh, according to one member of the audience, "presented the story of coal workers' pneumoconiosis as only the father of the entity as developed in Britain could. His presentation was complete with a review of the epidemiology, the pathogenesis and very expertly presented pathologic evidence."⁴⁶

Sustaining these connections by regular correspondence, Kerr served as the conduit for the latest developments abroad. He also elicited helpful comments from his British colleagues on the situation in this country. For instance, in 1955 John Rogan, chief medical officer of the National Coal Board, reacted to an idea that was being taken quite seriously at the time by some North American specialists in occupational medicine: "[Y]ou told me that there was a feeling in the States that coalminers became breathless because of emotional problems, particularly at home and at work. This seems to me absolute nonsense."⁴⁷

The fund's medical education program began to yield results by the end of the 1950s. For instance, in 1958 Eugene Pendergrass of the University of Pennsylvania, the dean of industrial radiologists, conceded in his textbook that CWP was a separate entity from silicosis. To be sure, adherents to the increasingly discredited notion of anthracosilicosis had not been driven from the field. Some of them had, however, clearly started to retreat.⁴⁸

The Politics of Prevalence

The union's health specialists also enlisted their British visitors to help persuade federal officials to undertake epidemiologic research to determine the magnitude of the CWP problem. Indeed, this was a longstanding concern of the UMWA, as indicated by its assistance to

the Public Health Service (PHS) prevalence study in the hard-coal region in the mid-thirties. Since the completion of that project, the union had sought additional research, especially a comparable large-scale inquiry among soft-coal miners. Interest in further epidemiological investigations had been one reason for UMWA support of the federal Coal Mine Inspection Act of 1941.⁴⁹ In 1952, the union requested that the PHS take up a wide-ranging inquiry into CWP in bituminous miners. In making this request, Warren Draper emphasized the unique capability of the PHS: "We know of no private group to which we can turn for a scientific unbiased investigation of this disease because the few that might be qualified to engage in such a study are financed by mine operators or the like and could hardly be impartial." Although, curiously, Draper did not at this point explicitly ask for a prevalence study, he did confront Surgeon General Leonard Scheele with estimates based on British experience: "We have reason to believe that approximately 50,000 are afflicted with this disease. Estimates have run as high as 90,000."⁵⁰

When the federal government failed to accept this challenge, the WRF sharpened the focus of its appeals to make it more difficult for bureaucrats to evade responsibility for examining this phenomenon. The fund began to call specifically for epidemiologic research to estimate the number of persons with CWP among the population of soft-coal workers and former workers across the nation as a whole. On November 12, 1953, Draper told Seward Miller, chief of the Division of Occupational Health at the PHS, "The first step should be to determine the prevalence of the disease."⁵¹ In the fund's strategy, such a study was a step on the path to hazard prevention: The determination of the immensity of the problem would, it was hoped, contribute to workers' compensation reforms like those instituted in Britain; these reforms would give coal operators a strong material incentive to control the dust hazard in their mines.⁵²

Federal public health officials balked at making a commitment. When Kerr and Ian McCallum met with Seward Miller and his staff on October 4, 1954, Miller "freely admitted [that] they had refused to accept the international radiological classification" system that would facilitate the administration of a prevalence survey.⁵³ Fencing with the PHS continued through the remainder of the Eisenhower administration. Sometimes officials pleaded that

they simply lacked the money to conduct the research. At other times, they assured the union that a thorough assessment of CWP prevalence was imminent despite budgetary constraints.⁵⁴ The union kept pushing for the project. In 1955, for example, the International Association of Industrial Accident Boards and Commissions (whose president that year, John Moulin, came out of UMWA District 12) called for research into prevalence after John Gilson addressed its annual convention. Draper made sure that the surgeon general received his own copy of the resolution of endorsement.⁵⁵ The miners' union also engaged in conventional political lobbying for the study.⁵⁶

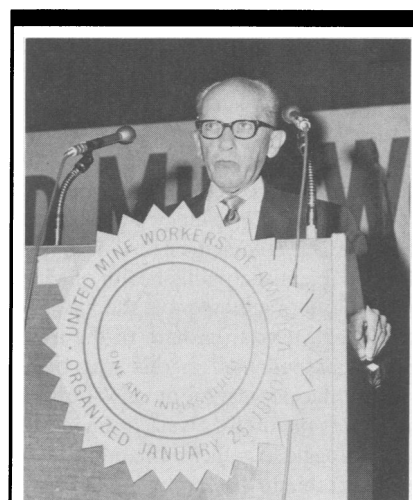
Finally, in 1962 Congress responded to a decade of pressure from the UMWA and appropriated funds earmarked for this project, and the long-awaited work commenced.⁵⁷ The PHS examined almost 4,000 bituminous miners and former miners across Appalachia during 1963–64. The researchers found that roughly one in ten working miners and more than one in five inactive miners had CWP. Their first published report of these results came in August 1965.⁵⁸ Despite the delay, this study was extremely useful to those interested in illuminating the miners' predicament. It demonstrated that CWP was undeniably a widespread phenomenon in this country. Further, a direct practical outcome of the work was the establishment of a research center in Beckley, West Virginia, modeled after the Pneumoconiosis Research Unit in Wales. This facility, subsequently relocated in Morgantown, West Virginia, was the forerunner of the Division of Respiratory Disease Studies, Appalachian Laboratory for Occupational Safety and Health, National Institute for Occupational Safety and Health.⁵⁹

During the interval before the PHS study took place, Leslie A. Falk, the WRF medical administrator in Pittsburgh, and others in Pennsylvania encouraged the state Department of Health to mount an investigation of the state's 30,000 coal workers. In this case, plans moved forward more rapidly. By the spring of 1958, the UMWA and mine operators had formally agreed to cooperate in a prevalence survey.⁶⁰ With the assistance of many Mine Workers' locals in the central and western mining regions of the state, Dr. Jan Lieben and his co-workers screened more than 16,000 soft-coal miners during the years 1959–61. Of the working miners aged 45 through 64 participating in the study, 23% (1610 of 6894) had indications

of pneumoconiosis on x-ray. Among the retirees of all ages, more than one third (992 of 2,732) displayed radiological evidence of pneumoconiosis.⁶¹ The state investigators also studied anthracite miners and, as expected, found an even higher prevalence of pneumoconiosis in this population.⁶² A concomitant study by the state vital statistics unit concluded that miners' occupational respiratory disease was a factor in more than 1,000 deaths per year.⁶³ These findings helped to rouse the US Public Health Service to do its own epidemiologic work. They also led Governor William Scranton to call a conference to discuss this problem. Representatives of the miners' union and its bituminous health fund played an active part in planning and carrying out the Governors' Conference on Pneumoconiosis, held in late 1964.⁶⁴ This event gave additional impetus to a renewed drive for workers' compensation reform. In the next legislative session, Pennsylvania lawmakers responded to union demands to broaden the definition of miners' respiratory disease to encompass more than silicosis.⁶⁵

Despite having carefully selected a random sample of mines from throughout the Appalachian region and having conducted examinations on 3,740 miners, the PHS remained unwilling to estimate the number of individuals in the US with CWP. Lorin Kerr took the federal data and combined it with the results of the Pennsylvania study, the data gathered from a clinical research project carried out at one of the WRF hospitals, and other available information. At a PHS-sponsored conference in Morgantown, West Virginia, in May 1967, he declared that at least 100,000 current and former mine workers suffered from CWP. Kerr estimated that an additional 20,000 men suffered from silicosis and that 5,000 more had mixed-dust pneumoconiosis. Apoplectic representatives of coal management at the meeting offered no alternative figure.⁶⁶ In contrast, by the time Kerr repeated this estimate in testimony before a US Senate subcommittee in March 1969, the National Coal Association had come up with its own conclusion from the PHS study, 15,000–16,000. Reflecting the influence of the UMWA's work, Surgeon General William Stewart stated at these hearings that 100,000 cases of pneumoconiosis was a good estimate of prevalence.⁶⁷

The WRF had its contradictions and limitations with regard to illuminating the problem of occupational disease in the coal fields. The most fundamental contra-



Dr. Lorin E. Kerr addresses the convention of the United Mine Workers of America, September 10, 1968. Courtesy of United Mine Workers of America Photo Archives.

diction was that the payment of tonnage royalties to the fund served to accelerate the mechanization of coal extraction. Because the money raised through royalties went for unimpeachable humanitarian purposes, this particular financing device served to discourage any criticism of technological change. But unquestionably, the virtually unrestricted introduction of mechanical loading and continuous mining equipment greatly increased the dust hazard underground.⁶⁸ Thus, the internalization of the health and welfare costs of production perversely led to more disease, not less. John L. Lewis, president of the union from 1920 until 1960, understood that mechanization caused disease but chose not to probe too deeply into this matter, apparently accepting a decline in working conditions as part of the price of the fund. Realistically, the industry's difficult competitive situation left the UMWA limited bargaining leverage on this issue when health and welfare benefits were being created in the mid-forties. In fact, miners' leaders had always encouraged or at least acquiesced in mechanization: The Lewis administration merely adhered to traditional UMWA policy on this perennial question. Moreover, no massive groundswell of rank-and-file opposition to ongoing mechanization arose to challenge the financial device of the WRF at the time of its founding. Nonetheless, in its negotiations in the late forties and early fifties the union could have tried to make introduction of new technology contingent upon the use of wetting agents and other feasible methods of dust control.⁶⁹

Elitism further circumscribed the fund's ultimate effectiveness. By the 1960s the organization had locked itself into a highly bureaucratic, scientific approach to the occupational disease problem. Instead of educating rank-and-file mine workers, the fund generally pursued a "trickle-down" strategy in which reports of British biomedical advances were given to scientists, public health officials, and medical practitioners in the US. Unfortunately, a sizable share of the information disseminated in this way never reached the population at risk. Further, the miners themselves were given no role in the struggle to gather more information on the problem. It was unthinkable, for example, that a representative drawn from among the tens of thousands of sick miners would participate along with WRF staff in the succession of advisory committees, planning task forces, and similar bodies set up by the PHS. Mass mobilization of disease victims to pressure the federal bureaucracy was similarly unthinkable. From the fund's perspective, miners were patients or beneficiaries only. Their role was to hold still while their x-rays were being taken. By the late sixties the rank and file could not hold still any longer. In fairness, the fund's attack on CWP was not exclusively elitist. Perhaps no single act did more to incite the uprising of 1969 than Lorin Kerr's address to the 1968 convention, which was excerpted in the *United Mine Workers Journal* the following month.⁷⁰ Nonetheless, the top-down orientation, dictated largely by the authoritarian leadership style of John L. Lewis, suffered from profound shortcomings.

Discussion

Despite these limitations, the union made a substantial contribution to wider recognition of occupational respiratory diseases among miners. The demands raised in the 1902 strike and the deliberations of the federal arbitration commission demonstrate that even during its formative years the United Mine Workers endeavored to illuminate many facets of this problem. The work of the WRF not only greatly increased the level of awareness of coal workers' pneumoconiosis but helped to lay the foundation for the advances in hazard control that began in 1969. Taking the long view of developments over the course of this century, it is clear that no one did more than the UMWA to bring to light this plague.

The union's engagement with this issue obviously encompassed much more than the activities of its international presidents. The fact that neither John L. Lewis nor W. A. Boyle, the UMWA president from 1963 through the end of the sixties, cared much about CWP and related disorders should not blind us to the commitment of many persons within the organization and its affiliated health care fund to addressing this issue. Thomas Kennedy, Lorin Kerr, and John Stannix, the rank-and-file member who testified before the 1902 strike commission, also represented the union. They and others associated with the UMWA contributed significantly to the protracted process of illuminating work-related respiratory problems in the coal industry. □

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References

1. Limitations of space prevent a full discussion of the many nuances in the conceptualization of miners' diseases—miners' asthma, anthraco-silicosis, coal workers' pneumoconiosis, black lung, etc.—and of their changes over time. Similarly, it is not possible within these confines to treat comprehensively all work-related respiratory disorders of miners. Accordingly, I have focused on coal workers' pneumoconiosis and given little attention to industrial bronchitis, emphysema, silicosis, and other chronic conditions. On the definitional issues, see Weeks JL, Wagner GR: Compensation for occupational disease with multiple causes: the case of coal miners' respiratory diseases. *Am J Public Health* 1986;76:58–61. Merchant JA, Taylor G, Hodous TK: Coal workers' pneumoconiosis and exposure to other carbonaceous dusts. In: National Institute for Occupational Safety and Health: Occupational Respiratory Diseases. DHHS (NIOSH) Pub. No. 86-102. Washington, DC: Govt Printing Office, Sept 1986; pp. 329–84, esp. pp. 329, 332–36, 338.
2. Smith BE: Digging Our Own Graves: Coal Miners and the Struggle over Black Lung Disease. Philadelphia: Temple University Press, 1987; pp. 75–144. Finley JE: The Corrupt Kingdom: The Rise and Fall of the United Mine Workers. New York: Simon and Schuster, 1972; pp. 221–35, 256–58. Seltzer C: Fire in the Hole: Miners and Managers in the American Coal Industry. Lexington, Ky.: University Press of Kentucky, 1985; pp. 93–101. Derickson A: Down Solid: The Origins and Development of the Black Lung Insurgency. *J Public Health Policy* 1983; 4:29–35. Fox DM, Stone JF: Black lung: miners' militancy

and medical uncertainty, 1968–1972. *Bull Hist Med* 1980; 54:43–63. Judkins BM: We Offer Ourselves as Evidence: Toward Workers' Control of Occupational Health. New York: Greenwood Press, 1986; pp. 63–77.

3. Miller DL, Sharpless RE: The Kingdom of Coal: Work, Enterprise, and Ethnic Communities in the Mine Fields. Philadelphia: University of Pennsylvania Press, 1985; pp. 256–79, esp. 260. Jones M: The Autobiography of Mother Jones, 3rd ed., Chicago: Charles H. Kerr, 1976; p. 61. Mitchell J: The mine worker's life and aims. *Cosmopolitan* 1901; 31:623–30.
4. US Anthracite Coal Strike Commission (hereafter ACSC): Proceedings, 2:13–14, Kosik Collection, Historical Collections and Labor Archives, Pattee Library, Pennsylvania State University, University Park.
5. *Ibid.*, 7:942,911–13,925.
6. *Ibid.*, 7:952,913–14, 10:1172. Derickson A: Occupational disease and career trajectory in hard coal, 1870–1930. *Industrial Relations* 1991;30:(in press).
7. ACSC: Proceedings, 7:949,911, 8:966–67.
8. *Ibid.*, 18:2398,2403.
9. *Ibid.*, 7:912,944, 8:964,993.
10. Merchant J, Taylor, Hodous: Coal workers' pneumoconiosis, pp. 362,367.
11. ACSC: Proceedings, 8:988. Reports of melanoptysis in coal workers appeared on both sides of the Atlantic in the nineteenth and early twentieth centuries. See Thomson W: On black expectoration and the deposition of black matter in the lungs, particularly as occurring in coal miners, etc. *Trans Med Chir Soc Lond* 1837; 20:236–37,239–40,242. Greenhow EH: Black lungs from a case of colliers' phthisis. *Trans Pathol Soc Lond* 1869;20:42. Ohio State Mine Inspector: Third Annual Report, 1876. Columbus: Nevins and Myers, 1876; p. 90. Lemen HA: A case of so-called phthisis pulmonalis nigra. *Colo Med J* 1882;1:20.
12. ACSC: Proceedings, 7:911–15,949, 8:965–67, 18:2403.
13. *Ibid.*, 7:944–45,921, 8:984, 11:1306.
14. *Ibid.*, 8:993, 19:2626–27. Derickson: Occupational disease and career trajectory.
15. ACSC: Proceedings, 7:911,913,920, 8:989,996, 2:13, 11:1264.
16. *New York Times*, 1902 Nov 15, p. 3; 1902 Nov 21, p. 5. *Chicago Tribune*, 1902 Nov 21, p. 16.
17. *Pittsburgh Press*, 1902 Nov 21, p. 1; 1902 Nov 14, p. 3.
18. ACSC: Proceedings, 22:3313, 30:4713.
19. *Ibid.*, 32:5146–48,5171–74, 37:6217–19.
20. *Ibid.*, 32:5154, 35:5704.
21. *Ibid.*, 34:5476,5544,5551,5559–60,5581.
22. *Ibid.*, 53:9440, 7:925–26.
23. ACSC: Report to the President. Washington, DC: Govt Printing Office, 1903; p. 51.
24. *Coal Age*, 1915 June 26, p. 1089; 1912 March 16, p. 750; 1915 Sept 25, p. 513; 1916 Aug 19, pp. 310–11. Wainwright JM, Nichols HA: Evidence that the miner resists tuberculosis. *Coal Age*, 1912 Aug 24, pp. 269–70. *Idem*: Coal dust as a corrective for tuberculosis. *Coal Age*, 1912 Aug 31, pp. 303–4.
25. Pico JL: Joseph L. Pico to Editor, 1911 Jan 28, *United Mine Workers Journal* (hereafter UMWJ), 1911 Feb 16, p. 7; UMWJ, 1911 Jan 19, pp. 12,20.

26. Andrews JB: Occupational diseases. *UMWJ*, 1913 Sept 11, p. 1. Idem: Compensation for work diseases. 1913 July 3, p. 2. Idem: Compensation for occupational diseases. *Survey*, 1913 April 5, p. 18. Lubove R: *The Struggle for Social Security, 1900-1935*, 2nd ed. Pittsburgh: University of Pittsburgh Press, 1986; pp. 48-49, 52, 64.
27. Bittner V: General discussion. *Am Labor Legislation Rev* 1915;5:30. Mitchell J: General discussion. *Ibid.*, p. 22. Feeney W: Eighth annual convention of American Association for Labor Legislation. *UMWJ*, 1915 Jan 7, p. 6. British miners at this time faced a similar dilemma with regard to compensation for nystagmus. See Figlio K: How does illness mediate social relations? Workmen's compensation and medico-legal practices, 1890-1940. In: Wright P, Treacher A (eds): *The Problem of Medical Knowledge: Examining the Social Construction of Medicine*. Edinburgh: Edinburgh University Press, 1982; pp. 187, 189.
28. UMWA District 1: Proceedings of the Sixteenth Consecutive and First Biennial Convention, 1915. Scranton: Sanders, n.d.; p. 79. Kennedy T: District 7 convention for legislative amendments, *UMWJ*, 1916 Oct 5, p. 7.
29. [JH Walker] to J. Steele, Jan 5, 1926 [sic—1927], John H. Walker Papers, folder 234, Illinois Historical Survey Library, University of Illinois, Urbana. Illinois State Federation of Labor Weekly News Letter (Chicago), 1927 Jan 8, pp. 1-2, 1927 Jan 29, p. 1. The international organization went on record in favor of extending workers' compensation to victims of miners' asthma at its 1924 convention. Ten years later, the UMWA broadened its position, advocating compensation for all occupational disorders. See UMWA: Proceedings of the Twenty-Ninth Consecutive and Sixth Biennial Convention, 1924. Indianapolis: Bookwalter-Ball-Greathouse, 1924;2:568. UMWA: Proceedings of the Thirty-Third Constitutional Convention, 1934. N publ., n.d.; 1:303.
30. UMWA District 9: Report of Proceedings of the Twentieth Successive Constitutional and Third Biennial Convention, 1922. N.publ., n.d.; pp. 68, 286. *UMWJ*, 1924 Oct 15, p. 5. UMWA District 1: Report of Proceedings of the Twenty-First Consecutive and Sixth Biennial Convention, 1925. Scranton: Commercial, n.d.; 122,255. Idem: Report of Proceedings of the Twenty-Fourth Consecutive and Ninth Biennial Convention, 1931. N.publ., n.d.; pp. 209, 274, 441, 443.
31. Pennsylvania Commission on Compensation for Occupational Disease: Occupational Disease Compensation: A Report. Harrisburg: n.publ., 1933; pp. 32, 23, and *passim*. Governor's Office: Statement, July 5, 1933, Gifford Pinchot Papers, box 852, Manuscript Division, Library of Congress, Washington, DC.
32. RR Sayers, Memorandum, May 15, 1933, Record Group 70: US Bureau of Mines Records, General Correspondence, 1910-50, box 1779, file 437.4, Washington National Records Center, National Archives and Records Administration, Suitland, Maryland. US Public Health Service: Anthracite-Silicosis among Hard Coal Miners. *Public Health Bulletin* 221. Washington, DC: Govt Printing Office, 1936; pp. 1, 2, 55, and *passim*.
33. Cherniack M: The Hawk's Nest Incident: America's Worst Industrial Disaster. New Haven: Yale University Press, 1986. Markowitz G, Rosner D: The illusion of medical certainty: silicosis and the politics of industrial disability, 1930-1960. *Milbank Quarterly* 1989;67(suppl):228-45. Idem: "The street of walking death": silicosis, health, and labor in the Tri-State region, 1900-1950. *J Am Hist* 1990;77:531-34. Derickson A: "On the dump heap": employee medical screening in the Tri-State zinc-lead industry, 1924-1932. *Business Hist Rev* 1988;62:656-77.
34. Pennsylvania: Laws, 1937. Harrisburg: n.publ., 1937; 2:2714-19. West Virginia: Acts and Resolutions, 1935. N.publ., n.d.; pp. 345-58. Illinois: Laws, 1936, Third Special Session. Springfield: n.publ., n.d.; pp. 40-74. Indiana: Laws, 1937. Fort Wayne: Fort Wayne Printing, 1937; pp. 334-71.
35. *UMWJ*, 1946 May 15, p. 16. UMWA: Proceedings of the Thirty-Sixth Constitutional Convention, 1940. [Washington, DC]: UMWA, n.d.; 2:68. UMWA: Proceedings of the Thirty-Eighth Constitutional Convention, 1944. [Washington, DC]: UMWA, n.d.; 2:81. *UMWJ*, 1946 Apr 15, p. 17; 1946 May 1, pp. 10, 20.
36. Dubofsky M, Van Tine, W: John L. Lewis: A Biography. New York: Quadrangle, 1977; pp. 458-59. Derickson A: Part of the yellow dog: US coal miners' opposition to the company doctor system, 1936-1946. *Internat J Health Services* 1989; 19:709-20. Fox M: United We Stand: The United Mine Workers of America, 1890-1990. [Washington, DC]: UMWA, 1990; pp. 404-6.
37. UMWA and US Coal Mines Administrator: National Bituminous Wage Agreement, Effective May 29, 1946. Washington, DC: UMWA, [1946]. ACSC: Award, Subsequent Agreements, and Resolutions of Board of Conciliation. Hazleton, Pennsylvania: Anthracite Board of Conciliation, 1953; pp. 129-30. UMWA and Operators: National Bituminous Coal Wage Agreement of 1947. Washington, DC: UMWA, 1947. Fox: United We Stand, pp. 405-13.
38. Ploss JE: A History of the Medical Care Program of the United Mine Workers of America Welfare and Retirement Fund. Master's thesis, Johns Hopkins University, 1981. US Department of the Interior, Coal Mines Administration: A Medical Survey of the Bituminous-Coal Industry. Washington, DC: Govt Printing Office, 1947; pp. 91-193, esp. 92, 113-14. Lorin E. Kerr, interview by A. Derickson, June 26, 1989 (tape in author's possession). Harrington D: The miner's health. *Nat Safety News*, 1933 Oct, p. 32.
39. Kerr LE: UMWA looks at coal workers' pneumoconiosis. *J Occup Med* 1970; 12:359. Idem, interview, June 26, 1989. *UMWJ*, 1952 May 15, p. 14; 1956 July 15, p. 13.
40. Gough J: Pneumoconiosis in coal trimmers. *J Pathol Bacteriol* 1940; 51:277-85. Idem: Pneumoconiosis in coal workers in Wales. *Occup Med* 1947; 4:86-97.
- Fletcher CM: Pneumoconiosis of coal-miners. *Br Med J* 1948; 1:1015-22, 1065-74. Fletcher CM, Mann KJ, Davies I, Cochrane AL, Gilson JC, Hugh-Jones P: The classification of radiographic appearances in coalminers' pneumoconiosis. *J Faculty Radiol* 1949; 1:40-60. Heppleston AG: The essential lesion of pneumoconiosis in Welsh coal workers. *J Pathol Bacteriol* 1947; 59:453-60. Great Britain, Medical Research Council: *Chronic Pulmonary Disease in South Wales Coalminers*, 3 vols. Special Report Series Nos. 243, 244, and 250. London: HMSO, 1942, 1943, 1945. Meiklejohn A: History of lung diseases of coal miners in Great Britain: part III, 1920-1952. *Br J Ind Med* 1952;9:208-20.
41. Kerr, interview, June 26, 1989.
42. GS Cooper to Kerr, Apr 11, 1955, UMWA Health and Retirement Fund Archives (hereafter HRFA), Series III, Subseries: Health Care Delivery, box 13, West Virginia and Regional Collection, West Virginia University Library, Morgantown. Kerr to Harriet L. Hardy, Apr 15, 1955, *ibid.* Pete [Carl M. Peterson] to Kerr, May 13, 1955, *ibid.* OA Sander to Kerr, Jan 30, 1956, *ibid.* Kerr, interview, June 26, 1989. Kerr: Coal workers' pneumoconiosis. *Ind Med Surg* 1956; 25:355-62.
43. Levine MD, Hunter MB: Clinical study of pneumoconiosis of coal workers in Ohio River Valley. *JAMA* 1957; 163:1-4. WRF: Report for the Year Ending June 30, 1959. Washington, DC: The Fund, 1959; pp. 18-19. Hyatt RE, Kistin AD, Mahan TK: Respiratory disease in southern West Virginia coal miners. *Am Rev Respir Dis* 1964; 89:387-401.
44. John Pemberton to Kerr, Nov 9, 1954, and Mar 17, 1955, HRFA, Series III, Subseries: Health Care Delivery, box 11. Warren F. Draper to Area Medical Administrators, Apr 11, 1956, *ibid.*, box 13. Hardy to Falk, July 1, 1957, *ibid.*, box 11. Hardy to Draper, June 8, 1959, *ibid.*, box 14.
45. Kerr to William A. Dorsey, Oct 7, 1952, *ibid.*, box 12. Falk to Draper, Dec 14, 1953, *ibid.* Draper to Area Medical Administrators, Jan 28, 1954, *ibid.* RI McCallum to Kerr, July 16, 1954, *ibid.* Kerr to Draper, Sept 27, 1954, *ibid.* Allen N. Koplin, interview by A. Derickson, Sept 29, 1990 (tape in author's possession).
46. [Falk?]: Office Session on Coal Workers' Pneumoconiosis by Jethro Gough, M.D., Feb 10, 1958, HRFA, Series III, Subseries: Health Care Delivery, box 11. *UMWJ*, 1955 Oct 1, p. 10; 1957 Dec 1, p. 11. Kerr, interview, June 26, 1989.
47. John Rogan to Kerr, Sept 30, 1955, HRFA, Series III, Subseries: Health Care Delivery, box 12. Kerr to AG Heppleston, June 10, June 21, and July 14, 1954, *ibid.*, box 13. Heppleston to Kerr, June 24 and July 6, 1954, *ibid.* For the contention that a substantial proportion of the disability suffered by pneumoconiotic miners was psychogenic, see Ross WD, Miller LH, Leet HH, Princif F: Emotional aspects of respiratory disorders among coal miners. *JAMA* 1954; 156:484-87.
48. Kerr, interview, June 26, 1989. Pendergrass EP: The Pneumoconiosis Problem with Emphasis on the Role of the Radiologist. Springfield, Illinois: Charles Tho-

- mas, 1958; pp. 105–10. Kammer AG: Occupational health problems of the bituminous coal miner. *Arch Ind Health* 1957; 15:466–67. Levine M, Waterman DH: Discussion, following Waterman DH: Pulmonary disease problems in 2140 hospital admissions of soft coal workers. *Ibid.*, p. 485. The Jefferson Medical College researchers subsidized by the Anthracite Health and Welfare Fund clung to the outmoded viewpoint, however. See Cathcart RT, Theodos PA, Fraimow W: Anthracosis: selected aspects related to the evaluation of disability, cavitation, and the unusual x-ray. *Arch Intern Med* 1960; 106:368–77.
49. US Public Health Service: Anthracosis among Hard Coal Miners, pp. 1–2. Kennedy T: Statement. In: US Senate, Committee on Mines and Mining, Subcommittee on S. 2420: Inspections and Investigations in Coal Mines, 76th Cong., 1st sess. Washington, DC: Govt Printing Office, 1939; pp. 84–85.
 50. Draper to Leonard A. Scheele, Oct 27, 1952, HRFA, Series III, Subseries: Health Care Delivery, box 13.
 51. Draper to Seward E. Miller, Nov 12, 1953, *ibid.* Miller to Draper, Nov 7, 1952, *ibid.*
 52. Staff to Draper, Oct 21, 1952, *ibid.*
 53. Kerr to Draper and Staff, Oct 8, 1954, *ibid.*, box 12. Kerr to Draper, Sept 27, Oct 1, 1954, *ibid.*
 54. Kerr, interview, June 26, 1989. Kerr to John C. Gilson, Dec 8, 1955, HRFA, Series III, Subseries: Health Care Delivery, box 12.
 55. US Bureau of Labor Standards: Workmen's Compensation Problems, 1955. Bulletin 186. Washington, DC: Govt Printing Office, 1956; pp. 81–91, 206, 209. Draper to Scheele, Nov 4, 1955, HRFA, Series III, Subseries: Health Care Delivery, box 13.
 56. Kerr, interview, June 26, 1989. Kerr to George Arnold, Aug 20, 1956, HRFA, Series III, Subseries: Health Care Delivery, box 12. Joseph Yablonski to Arthur S. Fleming, July 10, 1959, *ibid.*, box 13.
 57. Henry N. Doyle to Draper, Oct 12, 1962, *ibid.*, Subseries: Subject Files, box 20. Kerr, interview, June 26, 1989.
 58. Brown MC: Pneumoconiosis in bituminous coal miners. *Mining Congress J*, 1965 Aug pp. 44–48. A progress report on the study of chronic chest disease in bituminous coal miners, n.d. [ca. Apr 1963], UMWA District 2 Collection, box 144, Special Collections, Stapleton Library, Indiana University of Pennsylvania, Indiana, Pennsylvania.
 59. Kerr to Draper, Mar 19, 1965, HRFA, Series III, Subseries: Subject Files, box 37. Kerr, interview, June 26, 1989.
 60. Falk to Draper, Mar 5, 1957, *ibid.*, Subseries: Health Care Delivery, box 11. Falk to Draper, June 20, 1957, *ibid.*, box 14. Draper to Falk, April 23, 1958, *ibid.*
 61. Jan Lieben to Allen Croyle (UMWA Local 3648), July 23, 1959, UMWA District 2 Collection, box 144. David H. Kurtzman to David L. Lawrence, Mar 29, 1960, David L. Lawrence Papers, General File, box 97, Pennsylvania State Archives, Harrisburg. Lieben J, McBride WW: Pneumoconiosis in Pennsylvania's bituminous mining industry. *JAMA* 1963; 183:176–79. Lieben J, Pendergrass E, McBride WW: Pneumoconiosis study in central Pennsylvania coal mines, *J Occup Med* 1961; 3:493–506. McBride WW, Pendergrass E, Lieben J: Pneumoconiosis study of western Pennsylvania bituminous-coal miners. *ibid.* 1963; 5:376–88.
 62. McBride WW, Pendergrass EG, Lieben J: Pneumoconiosis study of Pennsylvania anthracite miners. *J Occup Med* 1966; 8:365–76. The main findings of this investigation were that 23.6% (385 of 1300) of the active miners examined either had or were suspected of having pneumoconiosis and that 75.5% (323 of 428) of the retirees had or were suspected of having pneumoconiosis.
 63. Vinyard JH, Lieben J: Pneumoconiosis mortality in Pennsylvania. *Penn Med J* 1960; 63:1118.
 64. William W. Scranton to James A. Reichley, Mar 16, 1964, William W. Scranton Papers, Reichley Subject File, box 4, Pennsylvania State Archives, Harrisburg. Program Committee for Special Session on Preventive Programs: Minutes, meeting of Oct 2, 1964, UMWA District 2 Collection, box 146. Pennsylvania Governor's Conference on Pneumoconiosis (Anthracosis-Silicosis): Proceedings. [Harrisburg]: Department of Health, Department of Labor and Industry, and Department of Mines and Mineral Industries, n.d.
 65. UMWA District 1: Proceedings of the Sixth Quadrennial Constitutional Convention, 1965. Wilkes-Barre, Pennsylvania: n.publ., n.d.; pp. 77–78, 155–56, 226–27. Joseph Yablonski to William W. Scranton, Oct 11, 1965, Scranton Papers, General File, 1963–66, box 49. Pennsylvania: Laws, 1965. Harrisburg: n.publ., 1965; 1: 695–704. Virginia: Acts and Joint Resolutions, 1968. Richmond: Commonwealth of Virginia, 1968; pp. 348–49.
 66. Brown: Pneumoconiosis in bituminous coal miners, pp. 44–48. Kerr LE: Coal workers and pneumoconiosis. *Arch Environ Health* 1968; 16:579–85. *Idem*, interview by A. Derickson, Sept 6, 1990 (tape in author's possession).
 67. Kerr LE: Statement. In: US Senate, Committee on Labor and Public Welfare, Subcommittee on Labor: Coal Mine Health and Safety: Hearings. 91st Cong., 1st sess. Washington, DC: Govt Printing Office 1969; 2:674. Garvey JR: Statement. In: *Ibid.*, p. 594. Stewart WH: Statement. In: *Ibid.*, pp. 729–30. Kerr, interview, Sept 6, 1990.
 68. US Bureau of Mines: Some Preliminary Data on Methods for Controlling the Dust Hazards in Mechanical Mining. Information Circular 7151. Washington, DC: The Bureau, 1941; pp. 2–4. Dix K: What's a Miner to Do? The Mechanization of Coal Mining. Pittsburgh: University of Pittsburgh Press, 1988; pp. 84, 93, 104–5. Hagy JA: Ventilation and dust control with continuous miners. *Coal Age*, 1956 July, pp. 56, 57. Jacobson M: Respirable dust in bituminous coal mines in the US. In: Walton WH (ed): *Inhaled Particles, III: Proc International Symp Organized by the Brit Occup Hyg Soc*, 1970. Old Woking, Eng.: Unwin Brothers, 1971; 2:752–53.
 69. Kerr, interview, Sept 6, 1990. Dix: What's a Coal Miner to Do?, pp. 126–214. Dubofsky, Van Tine: John L. Lewis, pp. 494–95, 505. Smith: Digging Our Own Graves, pp. 47ff. UMWA: Minutes of the Twelfth Annual Convention, 1901. Indianapolis: Hollenbeck Press, n.d.; pp. 46–47. UMWA: Minutes of the Fifteenth Annual Convention, 1904. Indianapolis: Cheltenham Press, 1904; p. 32. UMWJ, 1949, May 1, p. 3. Seltzer: Fire in the Hole, pp. 61–84, esp. p. 68. In contrast, in the 1910s the Western Federation of Miners forced the passage of dust-control legislation that changed the equipment and processes used to extract metal-bearing ores. See Derickson A: *Workers' Health, Workers' Democracy: The Western Miners' Struggle, 1891–1925*. Ithaca: Cornell University Press, 1988; pp. 164–69.
 70. Smith: Digging Our Own Graves, p. 63. UMWA: Proceedings, 1968, 1:312–24. Kerr: The road to dusty death. *UMWJ*, 1968, Oct. 1, pp. 9–11, 13.